

### Remarks

The various parts of the Office Action (and other matters, if any) are discussed below under appropriate headings.

Claim 1 has been canceled without prejudice or disclaimer of the subject matter contained therein. Claim 9 has been represented in independent form.

#### ***Claim Rejections - 35 USC § 102 and § 103***

Claim 2 recites a method of forming a plurality of contact holes that includes, among other steps, exposing a photoresist layer to a double-dipole illumination source that includes a first dipole aperture oriented and optimized for patterning regularly spaced contact holes and a second dipole aperture optimized for patterning the plurality of semi-isolated contact holes, wherein the first dipole aperture and the second dipole aperture have at least one of (i) different sizes or (ii) different spacings.

Page 4 of the Office Action notes that “Wang (‘727) fails to disclose a first dipole aperture and a second dipole aperture having at least one of different sizes and different spacings.” In fact, not only does Wang ‘727 fail to disclose first and second dipole apertures having different sizes and/or different spacings, Wang ‘727 fails to disclose first and second dipole apertures at all. At column 4, lines 36-39 (reproduced below), Wang ‘727 defines a quadrupole filter.<sup>1</sup>

FIG. 6 is a plan view of the quadrupole filter. This is an opaque circle within which are ***four clear circular areas that are symmetrically arranged to lie at the four corners of a “virtual” square.*** (Emphasis added).

Not only does Wang ‘727 establish a definition for quadrupole filter, ***Wang ‘727, when viewed in its entirety, teaches away from what is recited in claim 2.***

In this regard, the Examiner is reminded that MPEP 2142.02 VI mandates that “prior art must be considered in its entirety, including disclosures that teach away from the claims”. MPEP 2142.02 VI goes on to instruct that “[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from

---

<sup>1</sup> See also col. 4, lines 49-52 for another explanation of quadrupole filter.

the claimed invention. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

Because Wang '727 teaches away from what is recited in claim 2, the rejection of claim 2 and dependent claims 2-8, 10-13 and 15-16 should be withdrawn.

Despite the clear teaching away in Wang '727, and the definition of quadrupole filter, the Office Action turns to Wang '135 to cure deficiencies of Wang '727. In particular, the Office Action points to paragraphs [0030] and [0037], which are reproduced below.

[0030] FIG. 2a is a diagram of the illumination source used for an X-Y grid layout. In one type of modified illumination RET, a **quadrupole illumination source** 210 is aligned to the grid axes of the grid 220. In one embodiment of the present invention, although the virtual grid has grid axes aligned with the X and Y directions, the first and second grid patterns 240 are aligned with the diagonal directions. In a preferred embodiment, the quadrupole illumination source 230 for the first and second grid patterns 240 are also aligned with the diagonal directions. The poles of **quadrupole illumination** 230 for the first and second grid patterns 240 are placed on the x- and y-axes with distances to zero point determined by  $p_x$  and  $p_y$ . (Emphasis added).

[0037] The desired grid pitches,  $p_x$  and  $p_y$ , however, are smaller than the minimum pitch of the contact layer. The desired grid is decomposed into two interleaved grids. Each interleaved grid has its grid axes aligned along the diagonals of the desired grid with an interleaved grid pitch equal to the diagonal pitch of the desired grid. It should be noted that the grid pitches,  $p_x$  and  $p_y$ , can be different from each other.

Paragraph [0030] of Wang '135 teaches that the poles of the quadrupole illumination are placed on the x- and y-axes with distances (**collective**) determined by  $p_x$  and  $p_y$ . Paragraph [0037] simply discloses that the grid pitches can be different. It is respectfully submitted that the ordinary meaning of paragraph [0030] does not support an interpretation of each pole having a different or variable distance to the zero point.

Further, such an interpretation directly contradicts what is disclosed in Wang '727 with respect to quadrupole illumination. If the Examiner is relying on additional information besides what is presented on the record, it is respectfully submitted that the Examiner place this evidence of record, e.g., a signed and sworn affidavit or a prior art document supporting her assertion. See 37 CFR 1.104(d)(2).

At page 8, the Office Action notes "[t]here is no statement in Wang ('135) that the quadrupole is equally spaced. As understood, **the Examiner appears to be making**

***an argument based on what is not disclosed in Wang '135***, rather than what is disclosed in Wang '135. This argument appears to ignore the definition of quadrupole filter provided in Wang '727.

For at least these additional reasons, the rejection of claim 2 and dependent claims 2-8, 10-13 and 15-16 should be withdrawn.

Claim 9, which has been represented in independent form, further recites wherein the exposing step includes a single exposure. As is discussed above with respect to claim 2, Wang '135 is relied on to cure the deficiencies of Wang '727. It is respectfully submitted that this reliance is misplaced with respect to claim 9 because ***Wang '135 explicitly and repeatedly teaches away from what is recited in claim 9***. In particular, Wang '135 teaches, "[a]n optical lithography method . . . that uses multiple exposures to decrease the minimum grid pitch of regularly spaced features."<sup>2</sup>

As is discussed above, MPEP 2142.02 VI mandates that "prior art must be considered in its entirety, including disclosures that teach away from the claims". MPEP 2142.02 VI goes on to instruct that "[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

In light of the fact that Wang '135 teaches away from what is recited in claim 9, the rejection of claim 9 should be withdrawn.

---

<sup>2</sup> See, e.g., lines 1-2 of Abstract. Also see paragraph [0028] and paragraph [0038].

***Telephone Interview***

In the interests of advancing this application to issue and compact prosecution, it is respectfully requested that the Examiner telephone the undersigned to discuss any of the foregoing with which there may be some controversy or confusion or to make any suggestions that the Examiner may have to place the application in condition for allowance.

***Conclusion***

In view of the foregoing, request is made for timely issuance of a notice of allowance.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By /Jason A Worgull/  
Jason A. Worgull, Reg. No. 48,044

1621 Euclid Avenue  
Nineteenth Floor  
Cleveland, Ohio 44115  
(216) 621-1113

R:\JWorgull\AMDS\PH1624us\H1624-R02.doc